DOCUMENT RESUME

ED 305 989 PS 017 806

AUTHOR Bornholt, Laurel J.; And Others
TITLE Perceptions of Achievement: The Effects of Gender, School Type, and Grade.
PUB DATE 88
NOTE 25p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement; *Age Differences; Coeducation; Elementary Secondary Education; English; Foreign Countries; *High School Students; *Junior High School Students; Mathematics; Performance; *Self Concept; *Sex Differences; Single Sex Schools; *Standardized Tests
IDENTIFIERS Australia (New South Wales); *Estimation

ABSTRACT

To investigate factors which influence achievement self-concepts, students in grades 7 to 10 at three schools were asked to estimate their performance following standardized tests in mathematics and English. Two of the schools were single-sex and one was co-ed. Analyses dealt primarily with the effects of gender, grade, school type, and school subject on the difference between students' estimates and actual scores. The hypothesis that English would be a possible contrast domain to mathematics was not supported. Males tended to over-estimate their performance more than did females in both domains. Gender differences were constant from grade 7 to grade 10 and were not exaggerated in the co-ed setting. A strong effect of grade was evident. The lowest point for students' estimates at all three schools was in grade 8, with an increase in later grades. The results raise questions about the effects of transition to high school and within high school, the conditions under which school subjects such as mathematics and English are gender marked, and the relationship of specific estimates to general measures of achievement self-concept. (Author)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED305989

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Perceptions of achievement: the effects of gender, school type, and grade

PS 018806

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

L. J. Bornholt

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

Perceptions of achievement: the effects of gender, school type, and grade

Laurel J. Bornholt, Jacqueline J. Goodnow, and George H. Cooney

Macquarie University

RUNNING HEAD: Perceptions of achievement

Acknowledgements

Our debts are several. The study was made possible first of all by the co-operation of staff and students in several schools, together with the Department of Education and Regional Offices. We also wish to thank Herb Marsh, John King, and Alan Taylor for constructive advice, and Sue Hickson and her colleagues for their assistance in data management. Financial assistance was provided by a grant from the Australian Research Council. Authors' address: Behavioural Sciences, Macquarie University, Sydney, Australia, 2109.

Abstract

To investigate factors which influence achievement self-concepts, students in grades 7 to 10 at three schools (two single-sex and one co-ed) were asked to estimate their performance following standardized tests in Mathematics and English. Analyses dealt primarily with the effects of gender, grade, school type and school subject on the difference between students' estimates and actual scores. The hypothesis that English would be a possible contrast domain to Mathematics was not supported. Males tended to over-estimate their performance more than females in both domains. Gender differences were constant from grade 7 to grade 10 and were not exaggerated in the co-ed setting. A strong effect of grade was evident. The lowest point for students' estimates at all three schools was in grade 8, with an increase in later grades. The results raise questions about the effects of transition to high school and within high school, the conditions under which school subjects such as Mathematics and English are gender marked, and the relationship of specific estimates to general measures of achievement self-concept.

This study is concerned with the contributions of gender, grade, school subject and school type to students' estimates of their performance on standardized tests of English and Mathematics. The grades are the high school years 7 to 10. The three schools are either single-sex (male or female) or co-educational.

The general issue is the nature of factors that influence perceptions of achievement. The more specific issue is the link between gender and achievement in Mathematics (Burton, 1986, provides a review). In essence, the findings of several studies are that gender differences, when they occur, are less marked in actual achievement than they are in perceptions of achievement as indicated by evaluations of performance or attributions for success.

The inclusion of English as a possible contrast to Mathematics is adopted from a suggestion by Eccles, Adler, and Meece (1984). It stems from the need to test a number of hypotheses. (a) Females' sense of lower achievement in Mathematics may be unique to that subject. (b) Females' sense of lower achievement may cut across school subjects. (c) Males may display in English the lower sense of achievement that females display in Mathematics. In effect, each gender may display a lower sense of achievement in a domain that is not stereotyped as theirs. (d) Males may display no domain effect, while females do so.

Hypotheses (a) and (b) stem from the literature on gender and Mathematics. Hypotheses (c) and (d) are

suggested by studies of self-confidence and perceived self-efficacy on tasks that are occupationally gender linked. Males tend to see themselves as effective and confident for both male and female occupations, while females have lower self-confidence and a lower sense of efficacy on tasks usually regarded as masculine (Clements, 1987; Deaux, 1984; Lenney, 1977).

Most of these possibilities rest on the assumption that English is regarded as a female domain and Mathematics as a male domain. The two subjects are gender-marked in the sense that higher level courses in the two domains are not equally chosen when electives are available in senior high school (females predominate in English, males in Mathematics), and in the sense that males and females are often regarded as not equally good at the two (females are regarded as good at English, males at Mathematics) (Eccles et al., 1984; Fennema & Sherman, 1978). Whether these forms of gender-marking alter students' estimation of achievement has yet to be determined.

The inclusion of grades 7 to 10, the first four years of high school, is based on proposals that the effect of gender on performance estimates may vary with grade. Meece, Parsons, Kaczala, Goff, and Futterman (1982), for instance, have suggested that a decline in Mathematics self-concept through high school begins sooner, and is more pronounced, for females than for males. This earlier and more pronounced decline in self-concept for females may then act as a precursor to a decline in Mathematics

achievement (Eccles et al., 1984). Data on interaction effects with grade, however, are scarce, and alternative possibilities seem feasible. It could be, for example, that any decline in self-concept during high school represents mainly the effects of a disrupting transition from primary school, with both males and females equally affected and displaying equal recovery over time. Certainly, the impact of transition per se is expected to be strong (Simmons & Blyth, 1987; Miller, Eccles, Barber, Flanagan, Yee, Goldsmith, & Jacobs, 1987).

The sampling of both single-sex and co-educational schools is based on results that point to a possible interaction between gender and school type. The data are equivocal, but they nonetheless indicate the need to consider school type as a variable. One set of results comes from a comparison of fifth and sixth graders in single-sex and co-ed settings (co-ed/government and single-sex/private schools) on multiple dimensions of self-concept (Marsh, Relich, & Smith, 1983). Gender differences were larger in the co-ed setting. The largest differences were in higher Reading self-concepts for females, and, for males, higher self-concepts in Physical Abilities and Mathematics. It was suggested that "when self-concepts are formed relative to a reference group containing males and females, sex differences are accentuated in the direction of traditional sexual stereotypes" (Marsh et al., 1983, p.184).

A second set of results comes from a study in which all schools were private schools, both single-sex and co-ed (Foon, 1988). The study covered 16 schools (5 girls' schools, 6 boys' schools, and 5 co-ed). For grade 10 students, the self-ratings of achievement were higher in Mathematics for males, and higher in English for females. School type again showed some interaction with gender, but not in the same form as in the study by Marsh et al. (1983). School type was not a significant factor in males' achievement ratings. Females' ratings, however, did vary by school type in the form of a trend towards higher ratings in Mathematics for females at co-ed schools, and higher ratings in Science for females at single-sex schools.

A final note concerns the measures used for estimates of achievement. Previous studies of achievement self-concept have tended to use general questions. An item may ask, for example, 'How well do you think you do in Mathematics?' The method chosen in this study was first to administer standardized tests and then to ask for students' estimated scores on the tests. The procedure supplies a standard referent for the estimation of an achievement score, and a difference score (the difference between the students' estimate and achievement).

Overall, the aim of the study was to contribute to the material on gender and achievement by determining the relative influence, on evaluations of performance, of gender, grade, school type (single-sex or co-educational), and school

subject, with English and Mathematics taken as content areas that are differentially gender-marked.

Method

Sample

The sample consisted of 1,327 students. It covered all grade 7 students, and representative samples of grade 8, grade 9 and grade 10 students, at three large high schools in Sydney. These schools are within an area where socio-economic background is relatively homogenous. All schools were drawn from the same inspectorate of one Departmental region. This ensured that the schools were comparable on the basis of implemented policies, and that students came from the same feeder primary schools. (There are designated zones for each high school, but all students have the right to attend either a co-educational or single-sex school.) The distribution by school and grade is shown in Table 1.

Insert Table 1 about here

The sample included all grade 7 students because this grade allows a test of three effects, gender, domain, and school type, at a time of transition to high school. In grades 8, 9 and 10, samples were taken across achievement levels. The final selection of students in these grades reflected the preferences of the school Principals. In the co-ed school, this preference affected the extent to which

the same students completed tests of both Mathematics and English. Testing could only be in class groups, and in years 8, 9 and 10, students may be in different classes for Mathematics and English. As a consequence, 38% of students did both tests, while others completed either the English or the Mathematics test. At the single-sex schools, all students competed both sections.

The analyses cover all students, with English and Mathematics analysed separately. The effect of domain (comparing English and Mathematics) relies on results for those students who completed both tests.

Procedure

During first term of 1988, students completed a test of reading comprehension (TORCH, ACER, 1987) and a Mathematics achievement test (PAT Maths, ACER, 1984). These have been standardized on national samples. The English test contained 22 items testing comprehension of a passage recommended by the Australian Council for Educational Research (ACER) as being suitable for a wide range of achievement levels from grade 7 to grade 10. The Mathematics test contained 28 items. This shorter version of PAT Maths (alternate items) allowed the test to be administered within the available time and was statistically reliable (Cronbach alpha co-efficient 0.70). Following each test, students were asked, "What score do you think you will get on this test?" This score is the students' estimate.

Results

Figure 1 presents the main results, confirmed by the results of MANOVA (Table 2). Figure 1 shows the size of the difference scores (student's estimate minus actual score) by gender, grade and school. A constant gender effect is evident. So also is a strong effect of grade. The effects of school and school type are not as strong. Figure 1 also shows a difference between the two domains. An over-estimation for Mathematics by all grades is especially marked at grade 7. For English, there is an over-estimation by grade 7 students, and an under-estimation by grade 8 to 10 students. The largest differences between actual scores and students' estimates were in grade 7.

Insert Figure 1 about here

In the MANOVA analysis designed to test the effects of gender, school type and grade, difference scores were compared by grade (grade 7 to grade 10) and by group (GHS Girls High School, BHS Boys' High School, Females at the Co-ed School, and Males at the Co-ed School). Mathematics and English were analysed separately.

Insert Table 2 about here

Effects of gender. The strongest test of gender comes

from the co-ed school, where gender, school, and school type were not confounded. There were no significant gender differences in actual scores for Mathematics or English. However, males tended to make higher estimates of their achievement than females, more so in Mathematics ($F(1,439)=13.7$, $p<.001$) than in English ($F(1,390)=7.5$, $p<.01$).

Effects of school type (Single-sex and Co-ed). A comparison of the four groups shown in Figure 1 gives an indication of the importance of gender over the individual school differences and the effect of school type. The results do not support the suggestion that gender differences would be larger in a co-educational setting. In fact, the gender difference in mean estimated Mathematics achievement scores (mean for males=19.3; mean for females=17.2) was less within the co-ed school, than the difference between the single-sex boys' school (mean=18.2) and the single-sex girls' school (mean=15.7). There remains always the possibility that these schools are not completely equivalent. Nonetheless, the evidence does not point to an exaggeration of gender differences in a co-ed setting.

The effects of Grade. Figure 1 shows the strong and consistent effect of grade, in the form of a sharp decline in over-estimation from grade 7 to grade 8. The effect of grade is less dramatic from grade 8 to grade 10. This evidence does not confirm suggestions that the transition to high school would have a negative effect on self-

concepts, with grade 7 as the lowest point, followed by recovery. Instead, grade 7 is a high point and grade 8 is the low point.

The hypothesis that gender differences would interact with grade was not supported. In all schools, in both domains, the gender difference was constant across grades.

Domain. The constant gender difference from grade 7 to grade 10 was in the same direction for both English and Mathematics. That is, males tended to over-estimate their performance more than females, in both English and Mathematics, although actual scores of males and females did not differ from one another.

The domain effect was defined as the difference between English and Mathematics, both for actual scores and for students' estimates. Gender did not affect these differences, but grade and school did affect them. Table 3 shows these effects on both actual scores and students' estimates. Mean percentage differences (English minus Mathematics) are shown in Figure 2.

Insert Table 3 and Figure 2 about here

Clearly, students performed better on the English test than the Mathematics test. The estimated performance also favored English, but the estimates for English and Mathematics are closer to one another than are the actual scores. The effect of school is attributable to the girls' school where students' performance, and to a lesser extent

their estimates, were even more biased towards English than at the the other two schools. The effect of grade took the form of a significant tendency for the difference in actual scores (English scores higher than Mathematics scores) to be more pronounced in grade 7 than in grade 10. This was echoed in students' estimates. In effect, students make similar estimates of their performance in English and Mathematics, and the degree of similarity increases rather than decreases between grades 7 to 10.

Discussion

The aims were to determine whether gender affected estimates of performance on achievement tests, and to determine whether the effects varied with school grade, with domain, and with the different reference groups provided by being in a single-sex as against a co-educational school.

The results confirmed some previous findings. For Mathematics, males did tend to give higher estimates of performance than did females, a result also found in studies by Meece et al. (1982), Fennema (1974), and others. The same gender effect, however, was also found for English. The lower achievement estimates by females emerged as general in nature rather than varying by domain. The overall tendency was towards general rather than domain specific estimates, a tendency which increased from grade 7 to grade 10.

The interaction between gender and grade suggested by Eccles et al. (1984) - an earlier and more pronounced

decline in self-concept for females - was not found in the present sample. In fact, the overall effect of gender was not as great as expected, especially when grade (and to a lesser extent, school type) are taken into account.

In similar fashion, the effect of school type (single-sex or co-educational school) did not fit the appealing hypothesis that the immediate presence of males as a comparison group might exaggerate gender differences. Instead, the results provide support for Foon's (1988) argument that school type, when considered by itself, has limited potential as an explanatory variable for evaluations of performance. The gender composition of a school may still have an effect. The effect may be largely explicable, however, in terms of the characteristics of students who attend single-sex and co-educational schools, rather than the type of school per se (Lee & Bryk, 1986; Marsh, Owens, Myers, & Smith, 1987).

Gender was nonetheless a consistent contributor to estimates of performance. So also, in the present study, was school grade, even though this was not in the forms anticipated. The expected interaction with gender did not occur. Males and females were equally affected by changes in grade. The literature on transition from grade 6 to grade 7 (e.g. Simmons & Blyth, 1987) had led us also to expect that grade 7 would represent the low point, with grade 8 marking the beginning of recovery. Instead, grade 8 was the low point for this sample.

The difference in timing raises some interesting comparative questions about transitions and the aspects of transitions that affect self-concept. Within the school district covered by these Australian schools (and, in fact, within the State), year 8 marks some specific transitions. Year 8, and not year 7, is the year when students are broken into classes for various subjects, migrating from room to room, changing groups as the subject changes. They still have a home room and a home teacher but these mark more the beginning of the day than most of their hours. Year 8 is also the time when decisions are made about the level at which students will study various school subjects (general, intermediate, or advanced levels). Finally year 8, according to teachers' reports, is the year when students must expect to be no longer "babied". From now on, their performances will be graded by success, with few concessions given for effort. Further research is now needed on effects that occur in school settings which require particular transitions of students (transitions of place, peer group, or expectation) at various points in their course through school.

Overall, the results clarify and extend our knowledge of the several factors that may affect perceptions of achievement, and of the way these interact with one another. The general conceptual problem remains of finding ways to account for achievement self-concepts that will accommodate the effects of a variety of factors, and will offer direction for further research.

One possibility suggested by the present results and their fit with the results of previous studies is that effects vary with the salience of various bases of judgement. When asked to evaluate their own performances, for instance, students can be regarded as drawing upon several sources. The prevailing gender stereotypes, expressed by parents, teachers, or the media, provide one source: a source that may vary in strength from one social setting and one historical period to another. Further information may come from the available comparison group, from the feedback provided by others by way of comments in class or by way of streaming, and from the students' own sense of having done well or poorly. In addition, information may be offset by motivational factors: the wish, for instance, to protect oneself from too damaging an estimate of one's ability. These several sources - informational or motivational - may all be expected to vary in salience from one time or one situation to another, and the relative strength of their contributions to any self-evaluation may also be expected to vary accordingly. In effect, we need not expect to find identical results from one study of perceptions of achievement to another. We shall need, however, ways of varying the salience of various factors, so that variations from one set of conditions to another becomes more predictable. The impact of gender can then be compared more consistently with the impact of other conditions which contribute to perceptions of achievement.

References

Australian Council for Educational Research. (1984). Progressive Achievement Tests in Mathemetics, Form 3B. Melbourne: ACER.

Australian Council for Educational Research. (1987). Test of Reading Comprehension. Melbourne: ACER.

Burton, L. (Ed.). (1986). Girls into Maths can go. Holt, Rinehart, and Winston.

Clement, S. (1987). The self-efficacy expectations and occupational preferences of females and males. Journal of Occupational Psychology, 60, 257-265.

Deaux, K. (1984). From individual differences to social categories. American Psychologist, 39, 105-116.

Eccles, J. S., Adler, T. F., & Meece, J. L. (1984). Sex differences in achievement: a test of alternate theories. Journal of Personality and Social Psychology, 46, 26-43.

Fennema, E. (1974). Sex differences in mathematics achievement; A review. Journal for Research in Mathematics Education, 5, 126-139.

Fennema, E., & Sherman, J. (1978). Sex-related differences in mathematics achievement and related factors: a further study. Journal for Research in Mathematics Education, 9, 189-203.

Foon, A. E. (1988). The relationship between school type and adolescent self esteem, attribution styles, and affiliation needs: implications for educational outcome. British Journal of Educational Psychology, 58, 44-54.

Lee, V. E., & Bryk, A. S. (1986). Effects of single-sex secondary schools on student achievement and attitudes. Journal of Educational Psychology, 78, 381-395.

Lenney, E. (1977). Women's self-confidence in achievement settings. Psychological Bulletin, 84, 1-13.

Marsh, H. W., Relich, J. D., & Smith, I. D. (1983). Self-concept: the construct validity of interpretations based upon the SDQ. Journal of Personality and Social Psychology, 45, 173-187.

Marsh, H. W., Owens, L., Myers, M. R., & Smith, I. D. (1987). Sex differences in academic achievement and multidimensional self-concepts: the effects of changing from single-sex to coeducational high schools. Paper presented at the conference 'The Education of Girls: Research and Beyond', Monash University, Melbourne.

Meece, J. L., Eccles-Parsons, J., Kaczala, C. M., Goff, S. B., & Futterman, R. (1982). Sex differences in math achievement: Toward a model of academic choice. Psychological Bulletin, 91, 324-348.

Miller, C. L., Eccles, J. S., Barber, B., Flanagan, C., Yee, D., Goldsmith, R., & Jacobs, J. (April 1987). Changes in parents' beliefs and values during their children's transition to junior high school. Paper presented at the Meeting of the Society for Research in Child Development, Baltimore.

Simmons, R. G., & Blyth, D. A. (1987). Moving into adolescence: the impact of pubertal change and school context. Aldine de Gruyt.

Table 1

Distribution of students by group (gender and school type) and grade

	Groups of students			
	Single-Sex		Co-educational	
	Female	Male	Female	Male
Grade	Group1	Group2	Group3	Group4
7	181	152	112	74
8	48	47	76	57
9	53	52	100	71
10	53	57	110	84
Total	335	308	398	286

Table 2

The effect of group (school type and gender) and grade on differences scores (students' estimates minus actual scores) for Mathematics and English

Effects: Mathematics	(df)	F	(p<)
Interaction	(9,1029)	(ns)	
Grade	(3,1029)	41.1	(.001)
Group	(3,1029)	13.9	(.001)
Effects: English			
Interaction	(9,996)	(ns)	
Grade	(3,996)	88.7	(.001)
Group	(3,996)	26.7	(.001)

Table 3

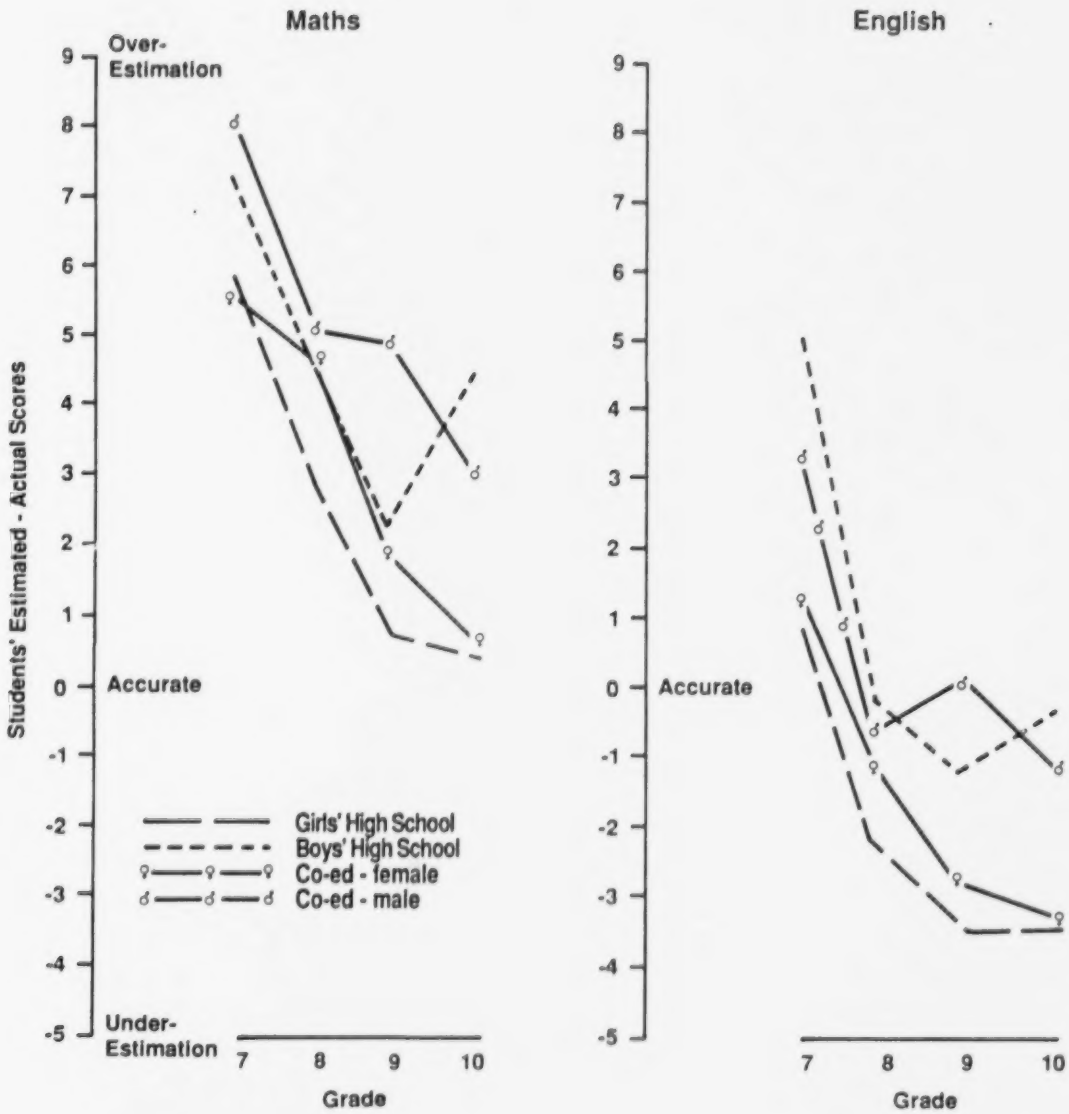
The effect of school and grade on the difference in scores between English and Mathematics, for actual scores and students' estimates. The interaction is not significant.

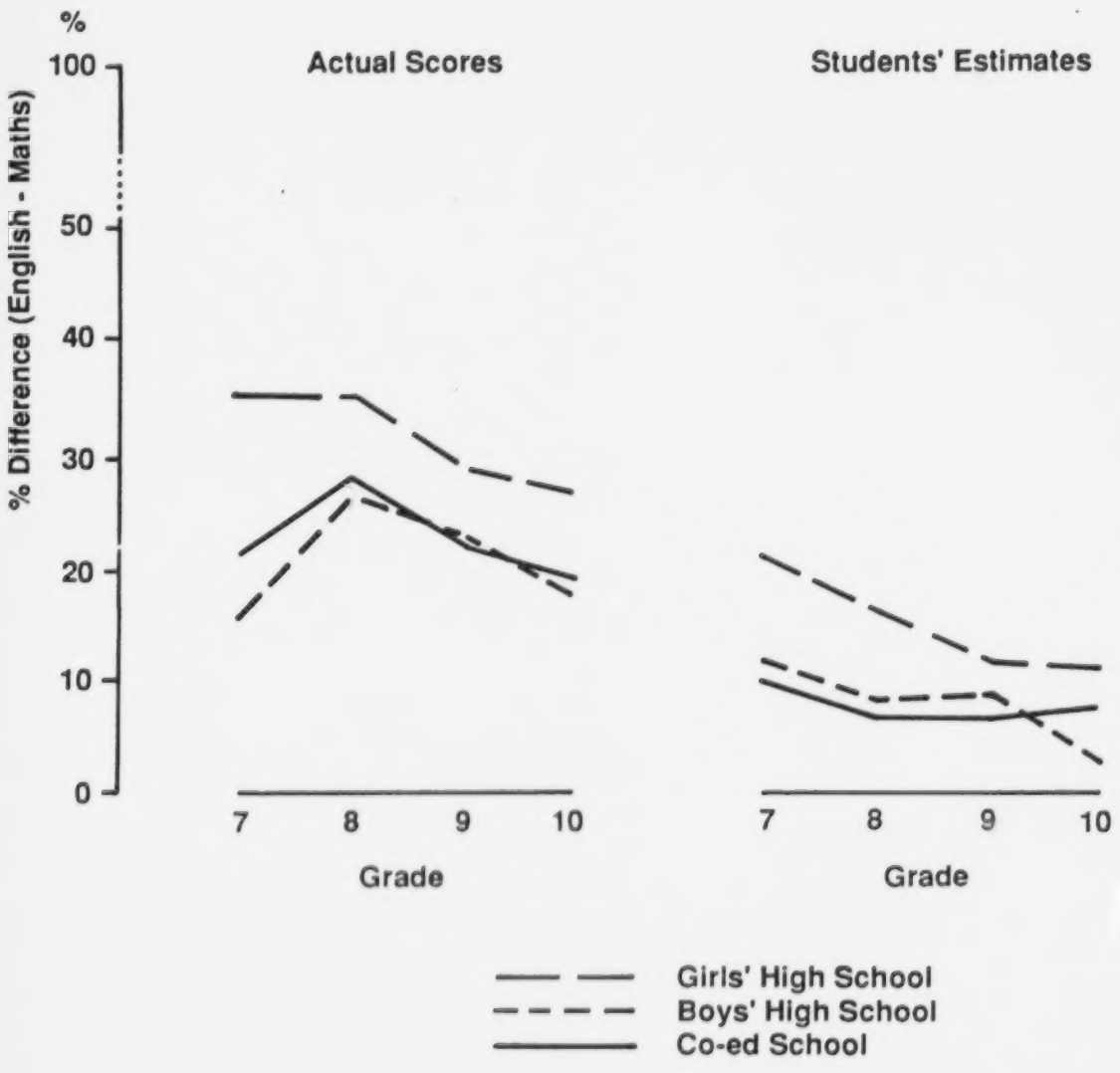
Effect	Wilks' lambda	(df)	F	(p<)
School	.95	(4,1614)	10.7	(.001)
Univariate F-tests				
Actual Scores		(2, 808)	20.8	(.001)
Students' Estimates		(2, 808)	7.7	(.001)
Grade	.96	(6,1614)	6.1	(.001)
Univariate F-tests				
Actual Scores		(3, 808)	5.2	(.001)
Students' Estimates		(3, 808)	5.5	(.001)

Figure captions

Figure 1. Mean differences between estimates and actual scores by school subject, group, and grade.

Figure 2. The difference between domains (English scores minus Mathematics scores), by grade and school, for actual scores and students' estimates.


Maths
English
Over-
Estimation
Accurate
Under-
Estimation
Students' Estimated - Actual Scores
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
7
8
9
10
Grade
Girls' High School
Boys' High School
Co-ed - female
Co-ed - male


%
100
50
40
30
20
10
0
% Difference (English - Maths)
Actual Scores
Students' Estimates
7
8
9
10
Grade
7
8
9
10
Grade
Girls' High School
Boys' High School
Co-ed School